

REMARKS

Claims 7, 9, 11, 13 and 15 are pending in this application. By this Amendment, claims 7 and 11 are amended, claim 15 is added and claims 10 and 14 are canceled. Support for the new claim and amendments to the claims may be found, for example, in the original claims and at page 10, line 23 - page 11, line 9, of the originally filed specification. No new matter is added.

Entry of the amendments is proper under 37 CFR §1.116 because the amendments:

(a) place the application in condition for allowance (for the reasons discussed herein); (b) do not raise any new issue requiring further search and/or consideration (as the amendments amplify issues previously discussed throughout prosecution); (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

I. Double Patenting

The Office Action provisionally rejects claims 7, 9-11, 13 and 14 on the ground of non-statutory double patenting over claims 9-16 of copending Application No. 10/531,578. Applicants respectfully traverse the rejection.

Because copending Application No. 10/531,578 has not issued, filing a Terminal Disclaimer to obviate a provisional double patenting rejection is premature. See MPEP §706.02(k). Applicants respectfully request abeyance of the double patenting rejection.

II. Claim Objections Under 35 U.S.C. §132(a)

A. Lower End Point of 1

The Office Action objects to the previous amendments to claims 1 and 11 under 35 U.S.C. §132(a) as adding new matter.¹ Specifically, the Office Action asserts that there is no support for amended claims 1 and 11 to have a lower endpoint of 1 part by mass of the alkali metal source and that such an amendment teaches away from the Applicants' invention. Applicants respectfully traverse the objection.

Without conceding the propriety of the rejection Applicants have amended claims 7 and 11 to recite "wherein the clay contains .01 to 10 parts by mass." Support for the amendments may be found, for example, in the specification at page 10, line 23- page 11, line 9. Accordingly, reconsideration and withdrawal of the objection are respectfully requested.

B. Potassium Hydroxide and Sodium Hydroxide

The Office Action objects to the previous amendments to claims 1 and 11 under 35 U.S.C. §132(a) as adding new matter.¹ Specifically, the Office Action asserts that there is no support for the disclosure that the alkali metal source is selected from the group consisting of potassium hydroxide and sodium hydroxide. Applicants respectfully traverse the objection.

An "alkali metal source is selected from the group consisting of potassium hydroxide and sodium hydroxide" is, at least implicitly, supported by the specification. Specifically, examples 3, 4 and 6, illustrate the use of potassium hydroxide or sodium hydroxide as a source of alkali metal. See specification, page 17, lines 2-14. In addition, Table 1 of the

¹ Applicants assume the Office Action intended to object to claim 7 instead of claim 1, as claim 1 was previously canceled. Accordingly, Applicant's response is based on this assumption.

specification further illustrates the use of both potassium hydroxide or sodium hydroxide as a source of alkali metal. See specification, page 21. Furthermore, page 7, lines 11-17, states:

When the alkali metal source is dissolved in a water content in the clay, the source forms hydroxide, and reacts with silica unavoidably existing on the surface of a non-oxide ceramic containing silicon to form alkali silicate glass (water glass) (see the following reaction formula (1)).



Thus, an "alkali metal source selected from the group consisting of potassium hydroxide and sodium hydroxide" is at least implicitly supported by supported by the original disclosure. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Claim Rejections Under 35 U.S.C. §103

A. Yamamoto, Kahlenberg and Noda

The Office Action rejects claims 7, 9-11, 13 and 14 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,716,512 to Yamamoto et al. (hereinafter "Yamamoto") in view of Kahlenberg et al. (hereinafter "Kahlenberg") and U.S. Patent No. 7,041,358 B2 to Noda et al. (hereinafter "Noda"). By this Amendment, claims 10 and 14 are canceled, rendering their rejection moot. As to the remaining claims, Applicants respectfully traverse the rejection.

The Office Action recognizes that neither Yamamoto nor Kahlenberg disclose the concentration range of alkali metal source in the honeycomb structure as recited in claims 7, and 11. See Office Action, page 6, #14. Additionally, neither Yamamoto nor Kahlenberg expressly teach the mixing of KOH or NaOH raw material in the ceramic honeycomb structure as recited in claims 7 and 11, rather than the *in-situ* formation of KOH or NaOH that may occur through the reaction of other raw materials.

Next, the Office Action asserts that the parts by mass of the alkali metal source is a result-effective variable and the claimed ranges of result effective variables are unpatentable. See Office Action, page 5, #7. Applicants respectfully disagree.

A particular parameter, such as parts by mass concentration, must first be recognized by the applied references as a result-effective variable before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. See MPEP §2144.05(II)(B). As discussed above, the applied references make no such identification.

Lastly, none of the applied references recognize the criticality of the amount of KOH or NaOH. The criticality of the amount of KOH or NaOH is seen by comparing Examples 3, 4, and 6 to Comparative Examples 1, 2, and 3. See specification, Table 1, page 21. Accordingly, the applied references provide no guidance as to the amount of alkali metal source to be used to prevent the collapse or crack formation in the calcinated body.

Regarding Noda, the Office Action fails to address why Noda is being cited in this rejection. The Office Action must articulate findings of fact that support the rationale relied upon in an obviousness rejection. See MPEP §§2141(III) and 2142. Because the Office Action failed to clearly articulate its finding in regards to this rejection the burden has not shifted to the applicant to submit evidence to rebut the fact finding made by the Office Action.

Therefore, independent claims 7 and 11 would not have been obvious because (1) it is not obvious to vary parameters or try possible choices where the prior art gives no roadmap or direction as to which possible choices are likely to be successful and (2) Yamamoto, Kahlenberg, and Noda, considered either separately or combined, fail to teach or suggest every feature of independent claims 7 and 11. Claims 9 and 13 depend from claims 7 and 11, respectively, and, thus, also would not have been obvious over Yamamoto, Kahlenberg, and

Noda. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Yamamoto, Kahlenberg and Stobbe

The Office Action rejects claims 7, 9-11, 13 and 14 under 35 U.S.C. §103(a) as being unpatentable over Yamamoto in view of Kahlenberg in further view of U.S. Patent No. 7,179,430 to Stobbe et al. (hereinafter "Stobbe"). By this Amendment, claims 10 and 14 are canceled, rendering their rejection moot. As to the remaining claims, Applicants respectfully traverse the rejection.

As discussed above, neither Yamamoto nor Kahlenberg, when considered separately or combined, teach or suggest ranges of parts by mass of the alkali metal source in the honeycomb structure as recited in claims 7 and 11. Furthermore, neither Yamamoto nor Kahlenberg teach or suggest the mixing of KOH or NaOH raw material in the ceramic honeycomb structure as recited in claims 7 and 11. Stobbe does not disclose or mention KOH or NaOH much less the mixing of KOH or NaOH raw material and, thus, does not cure deficiencies of Yamamoto and Kahlenberg with respect to claims 7 and 11. Therefore, Yamamoto, Kahlenberg, and Stobbe, considered either separately or combined, fail to teach or suggest every feature of claims 7 and 11.

For at least the reasons discussed above, claims 7 and 11 would not have been rendered obvious by Yamamoto, Kahlenberg, and Stobbe. Claims 9 and 13 depend from claims 7 and 11, respectively, and, thus, also would not have been rendered obvious by Yamamoto, Kahlenberg, and Stobbe. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Yamamoto, Kahlenberg and Noda

The Office Action rejects claims 7 and 11 under 35 U.S.C. §103(a) as being unpatentable over Yamamoto in view of Kahlenberg et al. in further view of Noda. Applicants respectfully traverse the rejection.

As discussed above, the Office Action recognizes that neither Yamamoto nor Kahlenberg disclose the concentration ranges of alkali metal sources in the honeycomb structure as recited in claims 7 and 11. See Office Action, page 6, #14. However, the Office Action asserts that Noda teaches the use of alkali metal as a reinforcing material, and "teaches the preferable range of reinforcing material to be from 0.5-10 parts by mass." See Office Action, page 6, #15. Thus, the Office Action asserts that it would have been obvious to use alkali metal as recited in claims 7 and 11 in the ceramic in order to strengthen the ceramic structure. Applicants respectfully disagree.

Noda discloses materials capable of protecting the end portions of the honeycomb structure from erosion, and does not use these materials throughout the entire honeycomb body as required by claims 7 and 11. See Noda, col 5 lines 26-48, reproduced in part below for convenience (emphasis added).

The important features of a second aspect of the present invention are as follows: the end portions 21 of the partition walls in the honeycomb structure are reinforced with a reinforcing material; and the reinforcing material is contained in from 5 to 25 parts by mass, more preferably from 10 to 20 parts by mass in relation to 100 parts by mass of the honeycomb structure before reinforcement in the reinforcement portion, namely, the end portions 22 of the partition walls....The preferable range of the reinforcing material is from 0.5 to 10 parts by mass when the total mass of the honeycomb structure before reinforcement is taken to be 100 parts by mass.

Clearly, the reinforced material is only used in the end portions and not over the entire honeycomb structure.

Furthermore, Noda does not disclose an alkali metal source. Instead, Noda discloses a composite oxide or numerous other materials for use as a raw material. See Noda, col. 8, lines 45-51, reproduced below for convenience.

In the present invention, it is preferable to use, as a reinforcing raw material, a substance which contains P, Zr, Si, Al, and Ti; phosphoric acid, aluminum biphenylate, a zirconia sol, a silica sol, a composite oxide composed of silica and an alkali metal, an alumina sol, and a titania sol are suitably used in addition to cordierite scrap powder, talc, alumina, and kaoline.

Similarly, Yamamoto discloses numerous options for the raw material. See Yamamoto, col. 4 , line 63-col. 5, line 3, reproduced below for convenience.

Further, the vitrifying material useable in the present process includes even a vitrifying material containing not only a material which becomes a complete vitreous material after firing but also a material which is converted into a crystalline material (e.g. crystallized glass) through a crystallization step after melting. There are also suitably used a clay, a water glass, a glaze, etc. as long as they perform the same role.

The Office Action fails to show that there is any finite number of identified, predictable potential solutions to the recognized need or problem of strengthening honeycomb material. Thus, the suggestion to choose potassium or sodium hydroxide of "0.01 to 10 parts by mass of the alkali metal source," is only found in the instant specification.

Therefore, the combination of Yamamoto, Kahlenberg, and Noda is improper because, as indicated above, numerous combinations are possible and there is no guidance that would have led one of ordinary skill in the art to the methods as claimed in independent claims 7 and 11 with a reasonable expectation of success. See MPEP §§2143(E) and 2143.02. Thus, Yamamoto, Kahlenberg, and Noda, considered either separately or combined, fail to teach or suggest every feature of independent claims 7 and 11.

For at least the reasons discussed above, claims 7 and 11 would not have been rendered obvious by Yamamoto, Kahlenberg, and Noda. Accordingly, reconsideration and withdrawal or the rejection are respectfully requested.

D. Joulin and Blount

The Office Action rejects claims 7, 9-11, 13 and 14 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,585,796 B1 to Joulin et al. (hereinafter "Joulin") in view of U.S. Patent No. 4,824,807 to Blount (hereinafter "Blount"). By this Amendment, claims 10 and 14 are canceled, rendering their rejection moot. As to the remaining claims, Applicants respectfully traverse the rejection.

The Office Action asserts that Blount discloses the addition of either metal oxides or alkali metal hydroxides in producing water glass. As such, the Office Action further asserts that it would have been obvious to one skilled in the art at the time the invention was made for sodium oxides to be added as an alkali metal source, in the range of 3-30% (or 3-30 parts by mass) in order to produce water glass within the slurry for reinforcement of the honeycomb structure. Applicants respectfully disagree.

Independent claim 7 is a method claim that requires the mixing of KOH or NaOH as a raw material, rather than the *in-situ* formation of KOH or NaOH as may occur in Joulin. Further, Joulin prefers 18-15% of a simple oxide that could be an alkaline metal. See Joulin, col. 2, lines 13-15. The present specification discloses that when the alkali metal exceeds the desired range, the alkali silicate glass formed by the alkali metal fills in pores of the calcinated body, and porosity unfavorably decreases. See Specification, page 11, line 23-page 12, line 2. Thus, Joulin teaches the use of significantly more alkali metal, which is unfavorable in the method of independent claims 7 and 11.

Blount does not cure the deficiencies of Joulin because the reference relates to a process for the production for flexible glass. It does not provide any reason for one of

ordinary skill in the art to use clay that "contains 0.01 to 10 parts by mass of the alkali metal source" with a reasonable expectation of success of arriving at the method of claims 7 and 11. See MPEP §§2143(E) and 2143.02.

Thus, claims 7 and 11 would not have been rendered obvious by Joulin in view of Blount. Claims 9 and 13 depend from claims 7 and 11, respectively, and, thus, also would not have been rendered obvious by Joulin and Blount. Accordingly, reconsideration and withdrawal or the rejection are respectfully requested.

IV. New Claim

By this Amendment, new claim 15 is presented. New claim 15 is directed to a method for manufacturing a porous honeycomb structure having features similar to the features recited in claim 7. New claim 15 is believed to be patentable over the applied references for the reasons similar to those discussed above. Prompt examination and allowance of new claim 15 is respectfully requested.

V. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Benjamin S. Prebyl
Registration No. 60,256

JAO:BQH/bsp

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OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

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